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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/069,306	07/03/2002	Donald F. Hooper	10559-303US1	1999

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EXAMINER
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PAN, DANIEL H

ART UNIT	PAPER NUMBER
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2183

DATE MAILED: 10/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/069,306

Applicant(s)

HOOPER ET AL.

Examiner

Daniel Pan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 August 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,4-8,10-16,18-22 and 24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,8,15,16,20,22 and 24 is/are rejected.
- 7) ☒ Claim(s) 4-7,10,12-14,18,19 and 21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 July 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 02/21/02, 06/04/04, 12/02/04
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

1. Claims 1,4-8, 10-16, 18-22,24 are presented for examination. Claims 2,3,7,17,23,25 have been canceled. Upon further search, Collieran et al. (6,006,575) is used for showing the automatically re-enabled thread.

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claim 24 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The reasons are given below.

3. As to claim 24, the claimed computer product residing on a computer readable medium for causing a multithreaded parallel processor to perform a function is not necessarily restricted a hardware. For example, page 4, lines 10-19 recited the application or the function was for the hardware based multithreaded processor. However, page 4, lines 22-25 recites another example of application was directed to a matching engine for electronic trading. The electronic trading is not tangible, and no clear definition has been set forth in the specification as what readable medium is. Therefore, it is not sure what embodiment the computer readable medium is directed to. If the computer readable medium is directed to the electronic trading, it is not tangible.

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Furthermore, although claim recites the computer readable medium was for causing the multithreaded parallel processor to perform a function, and to cause the processor to receive, perform, and wake up, it is an intended result, not a positive recitation of the limitation. The focus is not on the steps or features taken to achieve the final result which is useful, concrete and tangible, but rather that the final result achieved which is useful, concrete and tangible (see page 20, 101 Interim Guidelines).

4. Claims 1, 8, 15, 16, 20, 22, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moller (4,868,735) in view of Bitar (5,872,963) in view of Adkins (5,247,671) and Colleran et al. (6,005,575)

5. As to claims 1, 15, 16, 20, 22, 24, Moller disclosed a system including at least a swap instruction (swap microinstruction) that swaps a currently running context, corresponding to a first loop (see invoking loop) in a specified microengine (see fig.2A,B)

to let another context (invoked loop counter) to execute in that microengine and causes a different context (invoked loop counter), corresponding to different loop (invoked loop) and associated program counter to be selected (see the selection, the downloaded loop counter, and the replacement of the invoked loop count in the stack for execution in col.30, lines 39-54).

Moller also taught at least :

a) evaluating the state of a parameter of context process corresponding to a first loop (see the generation of CMUXCTL and STKMUXCTL in col.30, lines 39-54, see the invoking loop);

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b) performing swapping to cause a different context (invoked loop) and associated program Counter, corresponding to different loop (invoked loop count) , to be Selected in accordance with the parameter (see the selection, the download, and the replacement of the invoked loop count for execution in col.30, lines 39-54)., c) register stack (see the stack in col.30, lines 39-54, fig.zA (stack) ); d) arithmetic unit coupled to the register stack and a program control store for string the context swap instruction (see the ALU and program counter and memory and the microprogramming sequencer 10 in fig.1).

6. As to the parallel multithreaded processor in preamble, since no specific structure of the multithread has been reflected into the claim, it is read as any software construct in general, such as a nested loop, or a nested subprogram.

7. As to the microengine in claim 1, although in applicant's specification (pages , lines 28-33 ) teaches the microengines maintain the program counter in hardware, it also taught in page 3, lines 14-16, that the microengines can execute memory reference instructions to access the RAMS, and the sram SWAP (see claim 4) is the parameter field of a swap instruction (page 19, lines 1-11). Therefore, the microengine is read as any functional element to swap the context in either hardware or instruction format in general.

8. Moller did not specifically teach the use of the threads as claimed. Instead , Moller taught the use of loops. However, Bitar disclosed that a suitable number of threads were used to execute a loop in parallel (see col.10, lines 51-59). Therefore, it would have been obvious to one of ordinary skill in the art to use Bitar in Moller for

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including the threads as claimed because the use of Bitar could provide Moller the ability of the system to adapt to specific processing structure at a predefined set of software constructs (e.g. threads), and thereby, minimizing the overall latency of the loop processing in Moller, and because Moller also taught his system was used as building blocks in an architecture divided in control subsections (see col.1 , lines 24-35), which was a suggestion of the need for providing subdivided control programs for specific subsections of the system, and therefore, one of ordinary skill in the art should be able to recognize the use of threads as taught by Bitar into Moller in order to achieve the enhanced processing cycle, and in doing so, provided a motivation.

9. Neither Moller nor Bitar specifically showed the wakeup of the swap out context as claimed. However, Adkins disclosed a wakeup of a context (see col.8, lines 45-64). It would have been obvious to one of ordinary skill in the art to use Adkins in Moller for including the wakeup of the swapped context as claimed because the use of Adkins could provide Moller the control ability to restore the context of the associated task at a predetermined cycle, thereby reducing the latency caused during the resume of the task process, and it could be readily achieved by predefining the wakeup signals of Adkins into the swap instructions of Moller with modified read and write operands so that the specific wakeup command of the context of a given task of Adkins could be recognized by Moller, and because Moller did teach the activation of the context on the top of a stack by a selection signal caused by the swap instruction (see col.30, lines 39-44), which was a suggestion of the need of a function specific signal (e.g. wakeup, sleep, etc) into the swap instruction in order to achieve the enhanced context recovery or

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activation, and for the above reasons , provided a motivation. Moller is used as a primary reference because it clearly showed a swap instruction (see swap instruction) in col.30, lines 39-40). Adkins is used as secondary because it supplemented the teaching of the wakeup of the context.

10. As to the newly amended feature of the automatically re-enabled first thread, Moller did not specifically teach the automatically enabled first thread as claimed. However, Colleran taught automatically re-enable of a thread (see the automatic enabling of the thread by the process in col.5, lines 62-67, col.6, lines 1-24). It would have been obvious to one of ordinary skill in the art to use Colleran in Moller for including the automatically re-enabled first thread as claimed because the use of Colleran could provide Moller the ability to restart the task at desirable point of processing, and it could be readily achieved by predefining the automatic enabled thread of Colleran into the configuration file of Moller with modified system parameters (e.g. the enable flag and the R/W flags) such that the automatic enablement of Colleran's thread could be recognized by Moller, and because Moller also taught an activation of the context on the top of a stack by a selection signal caused by the swap instruction (see col.30, lines 39-44), which was a suggestion of the need for automatically activating or enabling the specific task or thread at system command, therefore increasing the system level flexibility, and in doing so, provided a motivation.
11. As to claims 8, 20, Moller was also directed to a inter-thread (see the inner loop in col.30, lines 25-68, col.31 , lines 1-5).
12. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moller

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et al. (4,868,735) in view of Bitar (5,872,963) in view of Adkins (5,247,671) and Colleran et al. (6,005,575) as applied to claim 1 above, and further in view of Turner et al. (6,505,229).

13. As to claim 11, neither Moller nor Bitar, nor Adkins, nor Colleran specifically showed the available data in the receive FIFO as claimed. However, Turner disclosed a system including a ready FIFO queue for allowing a swapping for a thread (see col.7, lines 38-37). It would have been obvious to one of ordinary skill in the art to use Turner in Moller for including the available data in FIFO as claimed because the use of Turner could provide additional capability of the given swap command to initiate the swapping at the available cycle of the FIFO, therefore, minimizing the wait time in the access cycle, and it could be readily done by configuring the FIFO of Turner with modified interface ports into Moller so that the available data in FIFO of Turner could be recognized by Moller, and for the above reasons, provided a motivation.

14. Claims 4,5, 18, 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the prior art of record further teaches the combined details of the sram swap (claims 4,18) and sdram swap (claims 5,19).

15. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the prior art of record further teaches the FBI swapping and wakeup when the thread's FBI was received indicating the FBI CSR,



Scratchpad, TFIFO, or RFIFO has completed.

16. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the prior art of record further teaches the parameter "seq num1 change/seq-num2 change" which specifies swap out of the current context and wakes it up when the value of the sequence number changes.

17. Claim 10 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the prior art of record further teaches the auto-push for swapping out and wakes up when SRAM transfer read register data has been automatically pushed by Fbus interface.

18. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the prior art of record further teaches the parameter specifying kill for preventing the current context or thread from executing again until the appropriate enable bit for the thread is set in the CTX ENABLES register.

19. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the prior art of record further teaches

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the voluntary swap pci parameter for swapping out and wakes up when the PCI unit signals a DMA transfer has been completed.

20. Claims 14 , 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the prior art of record further teaches the optional -token "defer one" specified in the swap instruction executing the additional instruction of the currently running context before the context was swapped.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dan Pan whose telephone number is 571 272 4172.

The examiner can normally be reached on M-F from 8:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chan, can be reached on 571 272 4162. The fax phone number for the organization where this application or proceeding is assigned is 703 306 5404.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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## ***21 Century Strategic Plan***

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